

CHAPTER 3

WASTEWATER GENERATION ANALYSIS

3.1 INTRODUCTION

Background

Wastewater generated within the City of Chula Vista is collected by City-owned facilities and conveyed to connections to METRO conveyance and treatment facilities for treatment and disposal. The City currently has capacity rights in the METRO system of 19.843 million gallons per day (mgd). However, METRO is in the process of completing a re-rating study. Preliminary indications from that study indicate that the City of Chula Vista will receive an additional 1.027 mgd, resulting in capacity rights of 20.870 mgd in the METRO System. Future City flow estimates, based on current growth projections, indicate that this capacity may be exceeded within the next five years. This chapter presents future generation projections that can be used by the City to establish a basis for future METRO capacity acquisitions to allow for implementation of the City's General Plan goals.

Analysis Objectives

The objectives of the wastewater generation analysis include:

- Quantify existing wastewater flow rates
- Quantify projected average wastewater flow rates at City build-out
- Summarize growth rate estimates over a 25-year planning horizon
- Determine additional METRO capacity requirements

Scope of Work

The scope of the analysis consists of development of projected wastewater flows generated within the City under buildout conditions. Projections were based on parcel data and population projections provided by the City. Generally, the analysis did not attempt to verify the underlying demographic data.

3.2 METHODOLOGY

Future flow projections were estimated independently using two sources – the City's parcel database and population projections compiled by the San Diego Association of Governments

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(SANDAG). Projections based on parcel data were developed by applying unit generation rates extracted from calibrated hydraulic models of the City's collection system. Estimated flows based on population data were developed by applying per capita residential and employment unit generation rates determined by calibration to measured City flow rates.

Flow projections developed from both data sources compared well with an approximate 1.3% difference in the estimated total average wastewater generation rate at City build-out.

Hydraulic Model Flow Projections

Hydraulic models of the City's collection system, described in more detail in Chapter 4, provide estimates of future flow rates. Four models were developed, each generally encompassing one or more sewer basins as shown in Table 3-1.

Table 3-1
Master Plan Hydraulic Models

Model	Basins
North-West	Sweetwater, G Street, Main Street, Telegraph Canyon west of Hilltop Drive, portions of Bay Front
Telegraph East	Telegraph Canyon west of Hilltop Drive
Poggi Canyon	Poggi Canyon, Date-Faivre
Salt Creek	Salt Creek

Wastewater loading in each model was simulated by applying unit generation rates to the number of residential dwelling units and non-residential acreage draining to selected manholes. The unit generation rates were varied until a reasonable match was achieved between simulated and measured flow rates and depths at 10 metering sites within the City's collection system. Based on previous hydraulic models developed for the City, each model used different land use classifications with which to base loading calculations. Consequently, the calibrated unit generation rates for each model are different. The land use classifications and calibrated generation rates are presented in Table 3-2.

The residential dwelling units and non-residential acreage data, which formed the basis for model loading projections, were compiled from the City's GIS parcel database, Traffic Analysis Zone Models, tentative maps, Specific Planning Area (SPA) and General Development Plans, and the current City General Plan.

Some portions of the City sewer to un-metered connections to the South Metro Interceptor (Bayfront Sewer Basin) or the County's Spring Valley Interceptor (Sweetwater Basin) and were not included in the hydraulic models. Flow projections for these areas were based on land use data from the City's GIS parcel database and house count information provided by the City's

Wastewater Engineering Section. Detailed descriptions of the model land use data are provided in Chapter 4.

**Table 3-2
Hydraulic Model Unit Generation Rates**

Model	Unit Generation Rate (gpd/du or gpd/ac)							
	SF Residential	MF Residential	Commercial	Industrial	Institutional	Elementary School	High School	Park
North-West	230/195	173/146	800	1,400	0	0	0	0
Telegraph East	160	113	1,415	1,415	1,415	5,094/site	22,641/site	0
Poggi Canyon	215	161	1,500	1,500	1,500	1,500	1,500	500
Salt Creek	215	161	1,500	1,500	1,500	1,500	1,500	500

Note: Zero factors for the North-West Model reflect a weekend calibration

SANDAG Population-Based Flow Projections

Future wastewater flow rates were estimated by applying uniform per capita unit generation rates to residential and employment population projections for the City. The population projections were extracted from SANDAG Preliminary 2030 Forecast. Unit generation rates were estimated by varying the residential and employment per capita rates such that the calculated flow based on current SANDAG population estimates for year 2003 matched the recorded average City flow rate for fiscal year 2003. The calibrated unit generation rates are 70 gpd per residential person and 20 gallons per employment person. For purposes of this analysis, year 2030 was assumed to represent buildout of the City per the current General Plan. Summaries of SANDAG data are included in Appendix B.

3.3 GROWTH FORECASTS

SANDAG population projections were available for years 2000, 2010, 2020, and 2030. Table 3-3 summarizes the residential and employment projections for each sewer basin.

Based on the projections shown in Table 3-3, the average annual residential growth rates for the City are 4.0%, 0.8%, and 0.3% for the periods 2000 to 2010, 2010 to 2020, and 2020 to 2030, respectively. The employment growth rate is 1.7%, 1.5%, and 1.6% for the same periods. Figure 3-1 illustrates the projected City growth rates.

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Table 3-3
SANDAG⁽¹⁾ Population Projections

Basin	Residential				Employment			
	2000	2010	2020	2030	2000	2010	2020	2030
Bayfront	304	604	1,158	1,609	3,402	4,517	4,864	6,137
Date-Faivre	8,100	8,100	8,279	8,401	3,142	3,142	3,229	3,885
G Street	23,812	25,402	27,620	29,347	8,738	10,030	10,423	10,998
Main Street	41,624	51,352	52,944	54,029	12,281	12,281	12,557	13,578
Poggi Canyon	12,010	29,622	30,869	31,977	929	1,766	3,140	3,142
Salt Creek	5,009	35,537	48,625	50,073	1,219	1,219	5,408	10,248
Sweetwater	50,105	51,844	53,936	55,110	9,491	12,736	12,990	14,268
Telegraph Cyn	55,992	74,099	75,005	77,399	17,914	20,861	23,586	26,059
TOTAL	196,956	276,600	298,436	307,945	57,116	66,552	76,197	88,315

⁽¹⁾ Projections from SANDAG Series 8 (2020), 2030 Projections from SANDAG Series 9 (2030).

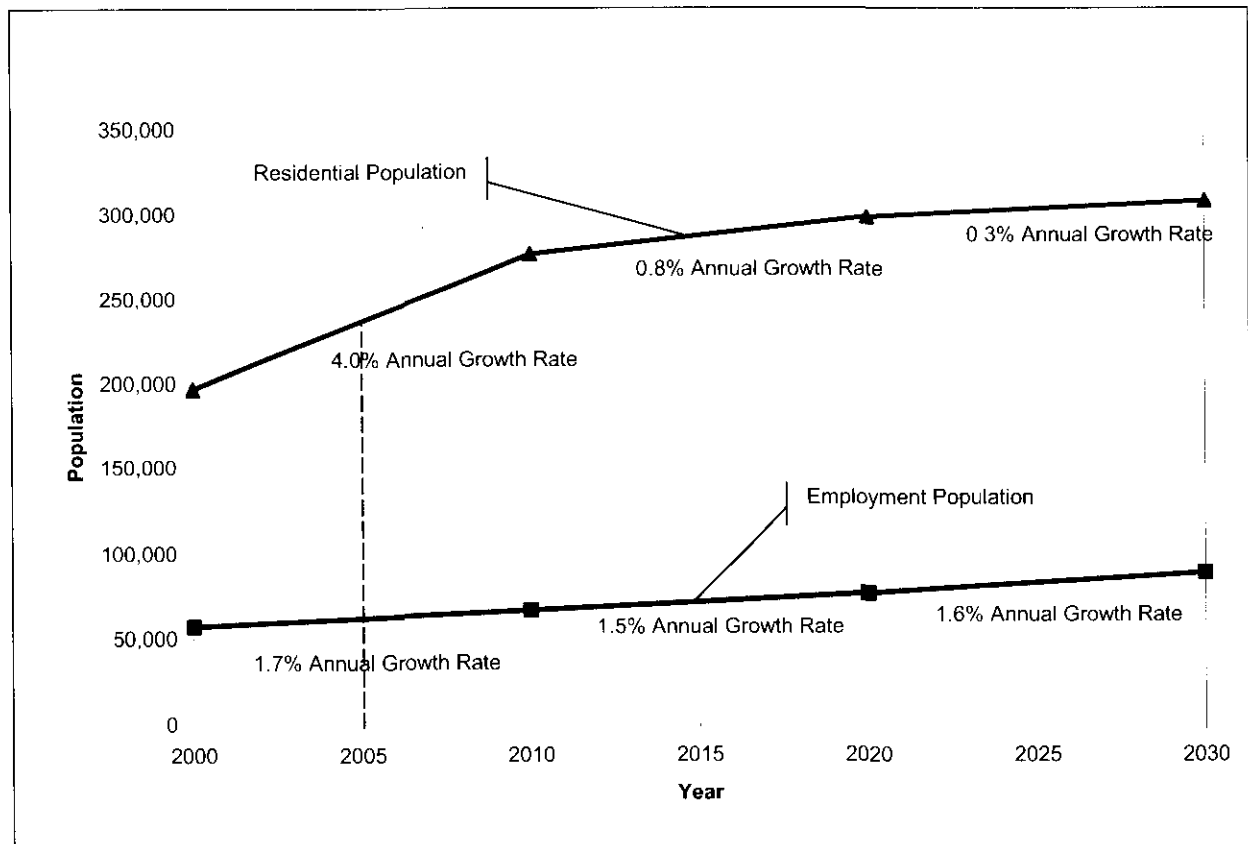


Figure 3-1. SANDAG Population Growth Projections

3.4 WASTEWATER FLOW PROJECTIONS

Using the methodologies outlined above, projected wastewater flow rates generated under City buildout conditions are 23.155 mgd based on hydraulic model data and 23.322 mgd based on SANDAG population projections. Year 2010 and 2020 projected flow rates estimated using the SANDAG forecasts are 20.693 mgd and 22.414 mgd, respectively. Table 3-4 and Figure 3-2 present the projected flow rates for each sewer basin based on SANDAG population projections.

Figure 3-3 shows the rate of increase of projected average City wastewater flows.

Table 3-4
Wastewater Flow Projections

Basin	Average Dry Weather Flow ⁽¹⁾ (mgd)			
	2000	2010	2020	2030
Bayfront	0.089	0.133	0.178	0.235
Date-Faivre	0.630	0.630	0.644	0.666
G Street	1.842	1.979	2.142	2.274
Main Street	3.159	3.840	3.957	4.054
Poggi Canyon	0.859	2.109	2.224	2.301
Salt Creek	0.375	2.512	3.512	3.710
Sweetwater	3.697	3.887	4.035	4.143
Telegraph Cyn	4.278	5.604	5.722	5.939
TOTAL	14.929	20.693	22.414	23.322

⁽¹⁾ Flows based on SANDAG population projections

Wastewater Generation

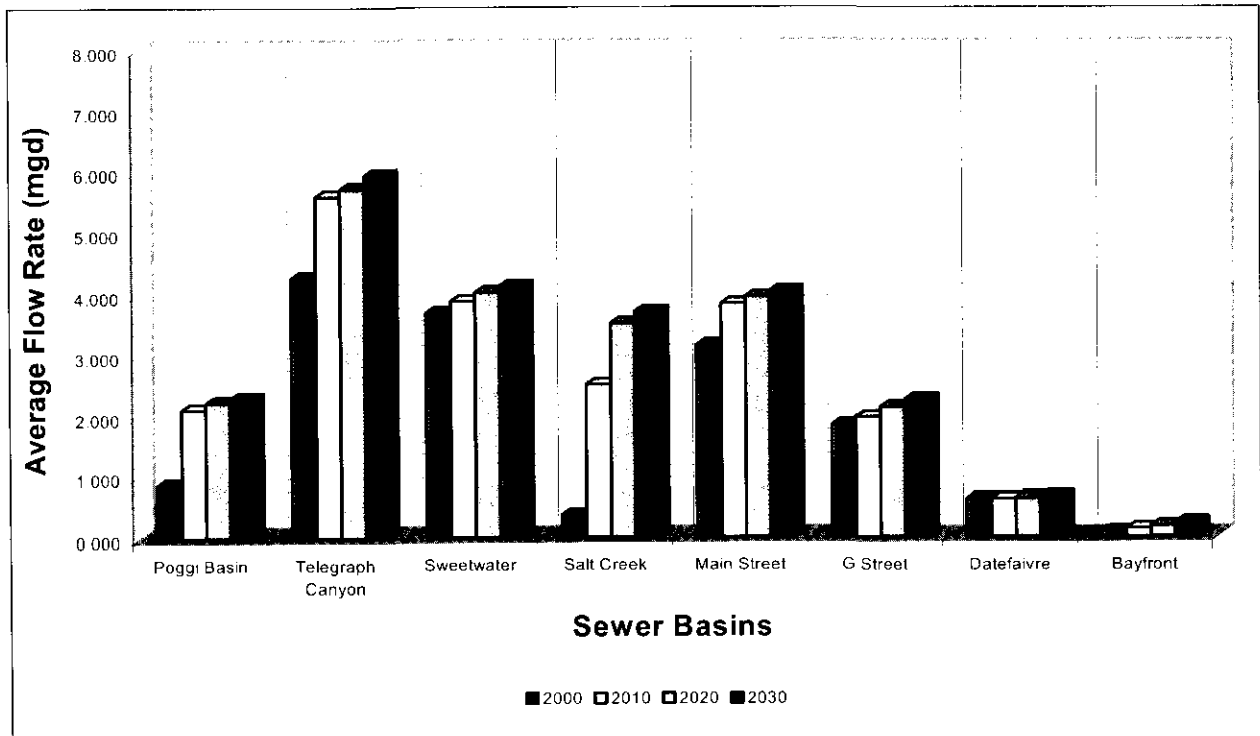


Figure 3-2. Sewer Basin Flow Projections

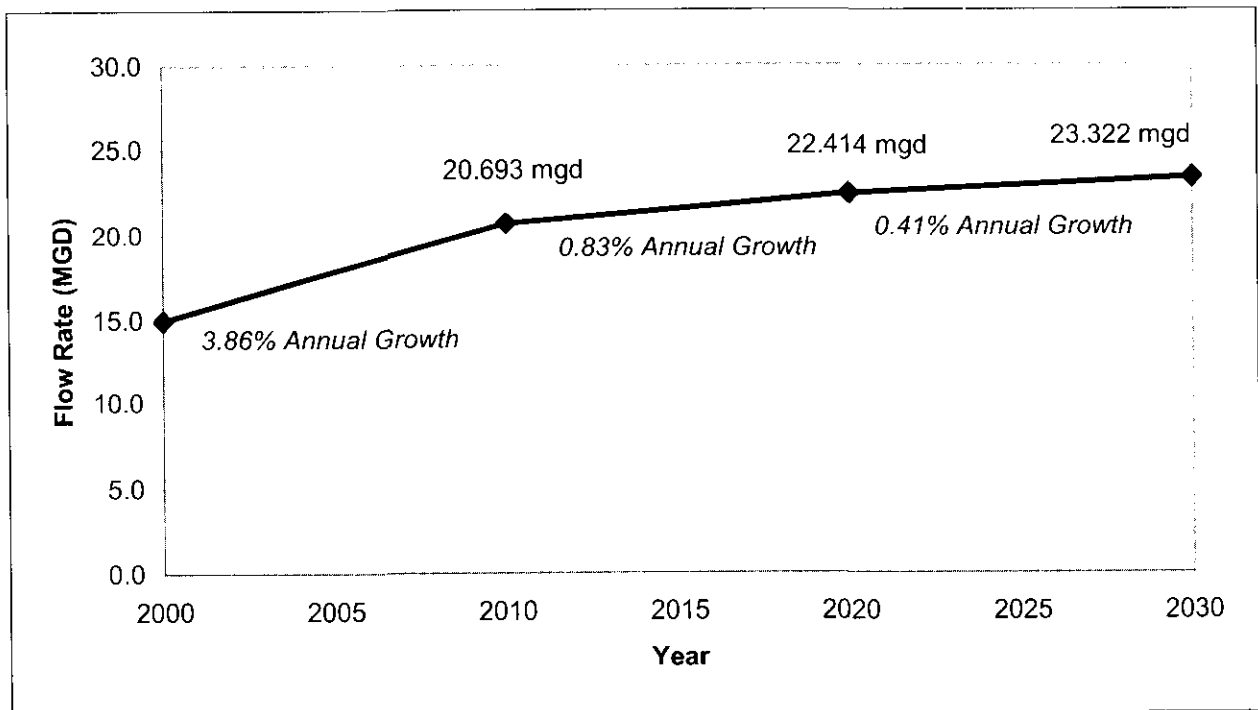


Figure 3-3. Projected Wastewater Flow Increase Rate

3.5 METRO CAPACITY

The City currently has capacity rights in the METRO system (comprised of conveyance, treatment, and disposal facilities) equal to 19.843 mgd and will soon be allocated additional capacity through the re-rating process currently underway. Figure 3-4 shows METRO capacity thresholds based on the future flow estimates given in Table 3-4. Based on current projections, the City's existing METRO capacity rights will be exceeded by year 2009. Additional capacity due to the expected re-rating would defer this date to approximately 2011. A total of approximately 3.5 mgd of additional capacity will be required by year 2030.

Note that the flow projections shown in Figure 3-4 are based on current General Plan buildout. The City is currently updating the General Plan to include higher density development in several sewer basins, most significantly the Salt Creek Basin. If the City implements a higher density plan, additional incremental METRO capacity may be needed. Impacts from the pending General Plan Update are discussed in Chapter 5.

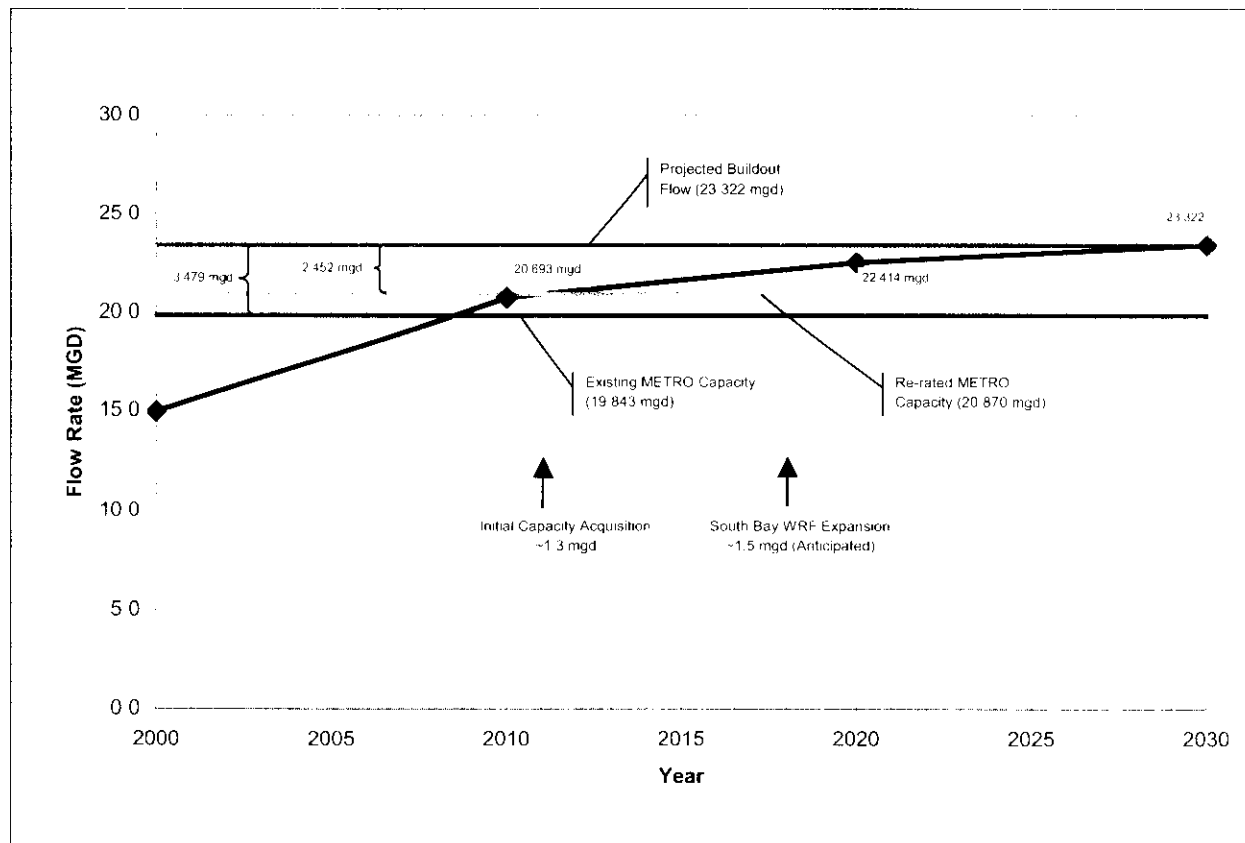


Figure 3-4. METRO Capacity Threshold

3.6 CONCLUSIONS

Existing (fiscal year 2003) average wastewater flows generated within the City of Chula Vista are approximately 16.346 mgd. Based on calibrated hydraulic model projections, the estimated average flow rate at buildout of the City per the current General Plan is 23.155 mgd. Based on SANDAG population projections, the average flow rate at buildout is estimated as 23.322 mgd. Future wastewater flows projected to be generated outside of the City that potentially will be conveyed through City trunk sewers to METRO facilities is 0.857 mgd based on City development estimates.

The City's current capacity right in the METRO system is 19.843 mgd. Based on SANDAG growth projections, the average flow is expected to reach the current capacity around 2009. Note that METRO is currently in the process of re-rating the overall METRO system capacity and may revise the City's capacity in the system. It is anticipated that the City's capacity rights will be increased based on the re-rating.

As with all planning-level analysis, it should be recognized that uncertainties exist in the underlying data and assumptions that formed the basis of this analysis. These include unit generation rates, future land use and population densities and distributions, and future capacity rights assigned to the City. In light of these uncertainties, the City may want to consider phased acquisition of additional METRO capacity to allow the City to periodically re-evaluate future flow projections based on updated regional development planning and measured flow rate analyses. Based on the findings of this analysis, the City may need to acquire an initial increment of additional capacity between 2009 and 2011.